LIBRARY
RECEIVED
☆ MAR 19 1938 ☆
U. S. Department of Agriculture

1.9
P64P

THE PLANT DISEASE REPORTER

Issued By

Division of Mycology and Disease Survey

Volume XXII Number 5

March 15, 1938

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

THE PLANT DISEASE REPORTER

Issued by

THE PLANT DISEASE SURVEY

DIVISION OF MYCOLOGY AND DISEASE SURVEY

Vol. XXII March 15, 1938 Number 5

IN THIS ISSUE

The first four articles deal with virus diseases.

Results of field tests with Chester's serological method for diagnosis of tobacco virus diseases are given in two articles, one by Paul R. Miller, page 74, the other by W. D. Valleau and Stephen Diachun, page 77.

In the third article K. Starr Chester reports cucumber mosaic in greenhouse petunias in Oklahoma, page 81.

The fourth virus article deals with the occurrence of curly top in the Pacific Northwest in 1937 and is by B. F. Dana, page 82.

L. W. R. Jackson reports Cylindrocladium associated with diseases of tree seedlings in forest nurseries in the eastern United States, page 84.

Anna E. Jenkins gives additional records of the occurrence of violet scab, in this country, Australia, and South Africa, page 86.

J. G. Gaines and S. B. Fenne report on the tobacco downy mildew situation in Georgia, page 88. Fenne also notes severe chlorine injury in tobacco plant beds, page 89.

The development of the apple scab fungus seems not to be affected by the duration of snow cover as observed in New Hampshire during several years past, according to Stuart Dunn, page 89. Additional reports on perithecial development, page 90, are by George L. Zundel for Pennsylvania, by P. C. Baines for Indiana, and by H. W. Anderson for Illinois. A note from Arkansas, in which John C. Dunegan reports on both the apple scab and the peach brown-rot fungi, was received too late to be placed with the others and is given on page 94.

Brief notes, page 91, include botrytis stem rot of tomatoes in Virginia, by Thomas W. Turner, and stem rot of crimson clover in Virginia, by Harold T. Cook.

The weather summary, page 91, includes February weather and the weather for the winter of 1937-38.

SERUM DIAGNOSIS OF VIRUS DISEASES OF TOBACCO

Paul R. Miller

Dr. K. Starr Chester, formerly of the Rockefeller Institute, who developed a serological method[1] of identifying tobacco virus diseases that had worked satisfactorily in the greenhouse and in preliminary field trials, wished to have it tested on a larger scale to determine whether it would have a practical application in the field diagnosis of unknown virus diseases. A logical opportunity for such a trial was the tobacco disease survey, which was the 1937 project of the Plant Disease Survey.

On May 18 Dr. H. A. Edson and the writer visited the Rockefeller Institute, where Dr. Chester demonstrated his method and furnished sera and necessary equipment for its use. In the first trials, made by them in cooperation with Dr. J. A. Pinckard at the Tobacco Field Experiment Station at Chatham, Virginia, August 9, familiarity with the use of the technique in the field was acquired. These tests at Chatham showed that for mosaics the results were clear-cut, but for the other virus diseases the required amount of tobacco juice was so great that it prevented clear vision of the reaction and there was some doubt as to the accuracy of the readings when compared with the checks. Apparently greenhouse-grown plants are better adapted for making these tests in that they are more succulent and the juice is more easily squeezed from them and is freer from other plant material, which, if present in excess, prevents observation of the precipitation.

Knowing that at Lexington, Kentucky, Dr. W. D. Valleau has a very extensive collection of tobacco viruses, which he propagates each year in the field, the writer went there to make further use of the serum method. Working with Dr. Valleau and Mr. Stephen Diachun, August 24 to 28, tests were made on 64 different mosaic selections, the preliminary results of which are shown in Table 1. Valleau and Diachun discuss these results further in their article in this issue[2].

It was soon observed that there seemed to be a relation between the type of reaction obtained and the depth of precipitate. It is noteworthy that only one selection of the 64 tested, 12316, did not react at all to the mosaic serum. However, the three selections, 12304, 12311, and 12360, gave such a weak reaction that they should probably be considered negative. This negative reaction was considered to be of sufficient importance to justify further tests in which most of the remaining mosaic serum was used.

---

[1] Chester, K. Starr. A simple and rapid method for identifying plant viruses in the field. Phytopath. 27: 722-727. 1937.

[2] Valleau, W. D., and Stephen Diachun. Test of strains of tobacco mosaic virus with Chester's field test. Plant Disease Reporter 22: 77-81. 1938

Table 1. Reaction obtained in tests with mosaic serum on sixty-four separate selections of mosaic virus propagated in tobacco plants.

Selection number	Reaction to mosaic serum	Depth of precipitate cm.	Description of symptoms[a]
12301	No infection	0	No symptoms
2	+ +	1/2	g--sl d--la p--b
3	+ + + +	3/4	g--sl d--m p--n b
4	- [b]	1/4	g--n d--s p--n b
5	+ + + +	3/4	g--n d--m p--n b
6	+ + + +	1-3/4	- - -
7	+ + +	1/2	l g--sl d--la p--b
8	+ +	3/4	g--sl d--m p--sl b
9	+ + +	1/2	g--m d--la p--b
12310	+ + + +	3/4	l g--sv d--la p--l
11	- [b]	1/8	l g--sl d--m p--b
12	+ +	1/2	g--sl d--m p--n b
13	+	1/2	y g--n d--m p--n b
14	+ + +	1/2	l g--d--m p--n b
15	+ + +	1/2	l g--sl d--m p--b
16	Negative	0	y--sv d--la p--b
17	+ + + + +	3/4	g--v sl d--m p--n b
18	+ +	3/4	g--v sl d--m p--n b
19	Plant missing		
12320	+ + +	3/4	g--v sl d--m p--n b
21	+ + + +	3/4	g--v sl d--m p--n b
22	+ + +	3/4	l g--b--la p--b
23	+ + +	3/4	l g--sl d--m p--b
24	+ + +	3/4	l g--sl d--m p--b
25	+	1/8	l g--m b--la p--b
26	+ + +	1/4	l g--y spts--sl d--m p--b
27	+ +	1/4	l g--sl d--m p--b
28	+ + + +	3/4	y g--d--la p--b
29	+ + + +	3/4	g--n d--s p--n b
12330	+ + +	1/2	g--y spts--m d--m p--b
31	+ + +	1/2	g--sl d--m p--b
32	+ + +	1/2	g--n d--m p--n b
33	+ + + +	3/4	g--sl d--m la p--b
34	+ + + + +	3/4	g--sl d--s p--b
35	+ + +	1/4	l g--y spts--sl d--m p--n b

[a] Explanation of symbols:

g = green	d = distorting	n = non	spts = spots
l = light	m = medium	b = burning	v = very
sl = slight	p = pattern	y = yellow	la = large

[b] Very weak reaction, not strong enough to be considered positive

Selection number	Reaction to mosaic serum	Depth of precipitate cm.	Description of symptoms
12336	+ + + +	1	g--v s d--s p--n b
37	+ + + + +	1-1/4	l g--m d--v la p--b
38	+	1/4	l g--sl d--m p--n b
39	+ + +	1/2	g--v sl d--m p--n b
12340	+ + + +	3/4	g--v sl d--m p--n b
41	+ + +	1/2	g--m d--la p--b
42	+ + +	3/4	l g--sl d--m p--b
43	+ + + +	1	l g--d--la p--b
44	+ + +	3/4	g--sl d--m p--n b
45	+ + +	1/2	y--m d--la p--b
46	+ + +	1/2	l g--v sl d--la p--b
47	+ + + +	3/4	g--d--la p--b
48	+ + +	1/2	g--n d--m p--n b
49	+ + +	3/4	l g--sl d--la p--b
12350	+ + +	1/2	l g--sl d--m p--n b
51	+ + +	3/4	g--d--la p--b
52	+ + +	3/4	g--y spts--sl d--m p--b
53	+ +	1/4	y rings--d--la p--b
54	+ +	1/2	l g--v sl d--m p--n b
55	+ + +	1/2	g--d--la p--n b
56	+ +	1/2	l g--n d--m p--b
57	+ + +	1/2	l g--v sl d--m p--b
58	+ + +	3/4	l g--d--la p--b
59	+	1/2	v l g--m d--la p--b
12360	- b/	1/8	l g--sl d--m la p--b
61	+ + +	3/4	l g--sl d--m la p--b
62	+ +	1/2	y g--sl d--m p--b
63	+ + + +	1-3/4	g--y spts--sl d--m p--b
64	+ + +	3/4	l g--sl d--la p--b
65	+ +	1/2	v l g--d--la p--b

Other sera, e. g., ring spot, vein banding, etch, aucuba and latent mosaics, reacted in the same manner as observed previously in the Virginia trials, that is, the reaction was obscured by the excessive amount of plant material present in the juice being tested. Apparently this serological method of diagnosis is very satisfactory for mosaics, but before it can be adapted for field use with other virus diseases some modification whereby the tobacco juice can be cleared of extraneous material seems necessary. So far, however, both the number of tests made and the number of persons who have become familiar with its application are too few to permit a real evaluation of its usefulness as a field method of diagnosis.

Upon leaving Lexington, a part of the remaining mosaic serum

was given to Dr. Valleau for the purpose of making further tests, the results of which are given in the article already referred to.

(Division of Mycology and Disease Survey)

TEST OF STRAINS OF TOBACCO MOSAIC VIRUS WITH CHESTER'S FIELD TEST

W. D. Valleau and Stephen Diachun

On August 25 Paul R. Miller of the Division of Mycology and Disease Survey, U. S. Bureau of Plant Industry, visited the Kentucky Experiment Station with the object of testing the field technic developed by Chester at the Rockefeller Institute[1] on tobacco plants affected with viruses on the Station farm. The tests on ordinary tobacco mosaic were made on 64 strains of the virus collected in different parts of the State. Duplicate field plants of Burley No. 16 had been inoculated with dried viruliferous material crushed in water some time previously by Dr. E. M. Johnson for the purpose of studying the degree of mosaic burn which each strain produced. The diseases produced included mild to severe non-burn and burn mosaics and mosaics of both burn and non-burn types ranging from yellow to green. While each pair of plants appeared to differ from its neighbors in mosaic symptoms, yet each would be included in what is commonly called "common field mosaic".

The tests were made in the field following Chester's field technic using the fourth leaf in the growing point. This was usually a well-developed leaf from which the necessary amount of juice could easily be squeezed. Mosaic patterns were present in all leaves tested. The results obtained from this preliminary test are given in Table 1, in which - represents no reaction, + a very weak but possibly positive reaction, and ++, +++, ++++, +++++ positive reactions of increasing

Table 1.

Type of reaction	Number of strains of virus
-	5
+	4
++	10
+++	29
++++	12
+++++	4

[1] Chester, K. Starr. A simple and rapid method for identifying plant viruses in the field. Phytopath. 27: 722-727. 1937.

strength. This preliminary test indicated that 5 strains of the virus failed to give a reaction while 4 others were very weak and should be considered questionable. A second trial of one of the negative reactors gave a positive reaction. The amount of material which gradually settled to the bottom of the tube corresponded fairly closely to the strength of the reaction. Even in the non-reactors there was a slight precipitate.

Further tests were made with the non-reacting virus 12316 in comparison with a strongly reacting virus 12315, using varying amounts of plant juice in 4.75 cc of serum (Table 2).

Table 2

Drops of plant juice	Virus 12315 (positive) Reaction after indicated minutes				Virus 12316 (negative)			
	30	50	75	180	30	50	75	180
1	-	-	-	-	-	-	-	-
2	-	-	-	-	-	-	-	-
3	-	-	+	+*	-	-	-	-
4	+	+	+	+	-	-	-	-
5	+	+	+	+	-	-	-	-

*Faint

In another test where 12316 was compared with 12315 and 3 virus-free plants a check was run with normal serum. There was no precipitation with normal serum but there was appreciable precipitation in the tube with 12316 plant juice and an equal amount in the tube containing juice from the genetic veinbanding plant suggesting that without a positive reaction throughout the tube, precipitation is of no importance (Table 3).

Table 3. Comparison of 12316 with several plants

	5 drops juice--4.75 cc serum		
	10 minutes	45 minutes deposit	45 minutes deposit with normal serum
12316	-	0.2 cm.	-
12315	+	0.4 "	+
Genetic veinbanding	-	0.2 "	-
Genetic variegation	-	Very slight green deposit	-
Healthy	-	No deposit	-

A test was made in which 12316 and 12315 were compared , using smaller amounts of serum and juice than Chester recommended; i.e., 5 drops of plant juice and 1/2 cc of serum in a very small tube (Table 4).

Table 4

	Plant or virus	Kind of serum	Reaction after 10 minutes	Precipitation after 90 minutes
1	12316 (neg.)	Tobacco mosaic	-	Very slight
2	12315 (pos.)	" "	+	0.9 cm.
3	Genetic veinbanding	" "	-	Chlorophyll on bottom
4	12316 (neg.)	Normal serum	-	Very slight
5	12315 (pos.)	" "	-	Very slight
6	Genetic veinbanding	" "	-	Very slight

A test was then made in which increasing amounts of juice from plant 12316 were used with 4.75 cc of virus serum in comparison with 5 drops of juice of 12315 in 4.75 cc mosaic serum, (Table 5).

Table 5

Virus and number of drops of plant juice	Reaction 10 minutes	Reaction 45 minutes	
12316			
5	-	-	No plant particles
10	-	-	Plant particles very small
15	- Slight curds	-	Plant particles large
20	- Medium curds	-	Plant particles large
25	- Heavy curds	-	Plant particles largest
12315			
5	+	+	No plant particles

The curds in this test appeared to be plant material and not the result of virus reaction, at least the curds differed very greatly from the flocculent material produced with virus 12315.

Virus 12316 was tested in duplicate, using the field technic, in comparison with 6 field mosaics, white mosaic, and white mosaic in

a resistant plant (white and yellow ring patterns) and in a slightly resistant plant (Table 6). Virus 12316 and another field mosaic failed to react. White mosaic in a susceptible plant and in a slightly resistant one produced a positive reaction but in a more highly resistant plant failed to react.

Table 6

Virus or plant	Ten minutes test 1	2
1 - Field mosaic	+	+
2 " "	+	+
4 " "	+	+
5 " "	+	+
8 " "	-	-
9 " "		+
12316	-	-
White mosaic	+	+
Mosaic-resistant plant, white mosaic	-	-
Slightly mosaic-resistant plant, white mosaic		+

The recorded tests leave little doubt that the virus 12316 consistently failed to give a positive reaction with the tobacco mosaic virus serum. Leaves were then collected from the field plants which gave no reaction or very weak reactions, from plants which gave an intermediate reaction, and from plants which gave the strongest reaction. These 18 samples were dried for 30 days, powdered individually, water added and inoculations made on White Burley No. 16 (susceptible), N. tabacum x N. glutinosa hybrid, and on N. glutinosa. Each gave positive results in White Burley and each caused necrotic spots in the hybrid and in N. glutinosa. Some of the above plants were set in a ground bench, where they made good growth, and tested December 24, 1937.

The results of this test are shown in Table 7. Again virus 12316 failed to show a reaction except a very mild one after 90 minutes. Virus 12360 which gave a questionable reaction in the field, also failed to react until after 90 minutes when a very weak reaction appeared to have developed.

The results may be summarized as follows: Certain tobacco mosaic viruses which were not inactivated by drying and which appeared to be typical tobacco mosaics in the field and greenhouse, failed to

Table 7

Virus	Field reaction	Reaction after minutes 10	20	30	40	60	75	90	Comparative deposit 48 hours
1. 12360	±	-	-	-	-	-	-	+*	1/2
2. 12306	++++	-	-	+	+	+++	+++	++++	3/4
3. 12316-1	neg.	-	-	-	-	-	-	+*	1/2
4. 12316-2	"	-	-	-	-	-	-	+*	4/5
5. 12337-1	+++++	+++	++++	++++	++++	+++++	+++++	+++++	1
6. 12343-1	++++	-	-	+	++	+++	+++	++++	3/4

* = same reading as 2 and 6 at 30 minutes; very weak positive

give a reaction when tested with tobacco mosaic serum using Chester's field technic. While this test gave positive results with most of the strains of tobacco mosaic tested, it cannot be considered as accurate a method for identifying viruses, which are now classed as common or ordinary field mosaic, as the drying test.

(Kentucky Agricultural Experiment Station)

CUCUMBER MOSAIC IN GREENHOUSE PETUNIAS

K. Starr Chester

In December, 1937, the writer's attention was called to a severe outbreak of mosaic of petunias in a greenhouse in Ardmore, Oklahoma. Several hundred young potted transplants were involved, and showed pratically 100 percent infection. The symptoms varied in severity but all of the plants showed green mottling and were badly stunted. The symptoms closely resmbled those of tobacco mosaic in petunia, and in view of the common occurrence of tobacco mosaic in greenhouse tomatoes and other Solanaceae, the trouble was tentatively ascribed to tobacco mosaic. Infection experiments, however, did not bear out this diagnosis.

When young Turkish tobacco plants were inoculated with the petunia virus, the clearing-of-veins symptom did not develop until the eleventh day. Sub-inoculations from these tobacco plants and inoculations from the diseased petunias to Nicotiana glutinosa L. failed to produce the local lesions characteristic of tobacco mosaic but did produce a systemic disease. Inoculations from the petunias to young

cowpea plants produced the small, punctate, local necrotic lesions characteristic of cucumber mosaic. In view of these facts and of the symptoms subsequently developed in Turkish tobacco plants, the petunia virus is considered to be a strain of cucumber mosaic. This conclusion influences the control measures to be recommended, since tobacco-mosaic-infected petunias would not be a menace to nearby greenhouse cucurbits while the cucumber-mosaic-infected petunias would present such a danger.

(Oklahoma Agricultural Experiment Station. Mar. 7).

OCCURRENCE OF CURLY TOP IN THE PACIFIC NORTHWEST IN 1937

B. F. Dana

During 1937 the distribution of curly top on vegetables was in general similar to that of the three previous years, although somewhat limited observations indicated that infection was reduced in many sections. The following observations were made during the growing season.

Oregon

Willamette Valley: Market gardens about Eugene, Salem, McMinnville, and Oregon City showed from a trace to 1 percent of curly top in tomatoes, mainly early infection with total crop loss for plants affected. Loss on other susceptible vegetables was negligible.

Portland Area: A trace of curly top was noted in tomatoes throughout the district. The total loss was low. However, in a few early fields on the upland area, about 20 percent of the plants were affected and losses were estimated at the same amount.

Rogue River Valley: Observers reported only a trace of curly top in tomatoes in the Medford-Ashland area where some 750 acres of canning tomatoes were grown.

The Dalles Area: Limited observations indicated losses up to 50 percent in tomatoes with the average loss for the district estimated at 1 percent.

Milton-Freewater Area: Observations of tomato fields were made July 11. A trace to 5 percent of the plants showed symptoms of curly top. Losses were estimated as closely parallel to the percentage of curly top.

Hermiston Area: Tomatoes grown in the open were almost a total loss. Plants grown under lath or cloth shades or under trees showed much less injury than those grown in the open. Snap-bean varieties were almost a total loss. Varieties of Cucurbita maxima and C. pepo were severely injured and in many cases killed in the seedling stage. On bush lima beans curly top caused stunting, increased branching, and blossom drop, and on watermelon it caused severe injury to tips of runners.

Washington

Puget Sound Area: Observations were made September 18 around Lake Washington. Tomatoes were trained to stakes and showed 1 percent of curly top infection. Farther south toward Renton and Auburn only a trace was seen. A trace of curly top was seen on pole beans. One field of Boston Marrow squash in the Puyallup Valley showed 2 percent of the plants with mild curly top symptoms from late infection.

Southwestern Washington: A few home gardens about Vancouver showed a trace to 5 percent of curly top in tomatoes.

G. A. Huber of the Western Washington Experiment Station reported a field of tomatoes at Woodland where 30 percent of the plants were killed by curly top. The crop on these plants was a total loss.

Differences of percentages of disease in this area may perhaps be best explained by differences in time of setting in the field.

Yakima Valley: On September 20, market gardens were examined around Selah, Yakima, Wapato, Toppenish, and Prosser. In the vicinity of Wapato and Toppenish tomatoes had been seeded thickly in drills directly in the field. Growers have obtained larger yields than when plants were transplanted. The percentage of loss was less than the percentage of plants killed. Infection was rather uniform throughout the area. The following records are representative:

Location	Variety	Acres	Diseased %	Loss %
Selah	Tomatoes	1/4		50
Donald	"	1	75	50
"	"	1/4	20	15
"	Table Queen squash		100	Severe injury
"	Cucumbers	1/8	100	Tips of runners injured
Wapato	Tomatoes	2-1/2	60	50
"	Table Queen squash	Plot	100	Severe injury
"	Tomatoes	3	75	50

Location	Variety	Acres	Diseased %	Loss %
Toppenish	Table Queen squash	1/16	100	Severe injury
"	Tomatoes	3	50	20
"	Peppers	1/4		30

On the Experiment Station at Prosser transplanted tomato plants were all dead, while on the plot seeded in drills, fewer plants were killed than on an equal plot set to transplanted plants. Snap beans were seriously injured.

Kennewick Area: Tomato growers seeded directly in the field to lessen losses from curly top. In the different tomato fields observed, the disease varied from a trace to 75 percent. Losses are roughly estimated to equal half of the percentage of disease present.

Idaho

J. M. Raeder, Department of Plant Pathology, University of Idaho, has reported under date of February 14, 1938, 10 percent loss in tomatoes, 10 percent loss in garden beans, and 5 percent loss in field beans for the State of Idaho.

(Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry)

CYLINDROCLADIUM ASSOCIATED WITH DISEASES OF TREE SEEDLINGS

L. W. R. Jackson

During recent years Cylindrocladium scoparium Morg. has appeared in association with diseases of tree seedlings at several forest nurseries in the eastern United States. The fungus has been observed most frequently in isolations from damped-off and root-rotted first-year conifer seedlings, especially in the nurseries at Newfoundland and Washington Crossing, New Jersey. Graves[1] in 1915 reported the isolation of C. scoparium from rotted roots of 1-year-old red pine (Pinus resinosa Aiton), northern white pine (P. strobus L.), hemlock (Tsuga canadensis (L.) Carr.), and 2-year-old red pine, but stated that inoculation attempts gave negative results. Positive inoculations by the writer on pine seedlings will be published in the

[1] Graves, Arthur H. Root rot of coniferous seedlings. Phytopath. 5: 213-217. 1915.

near future. The following list gives a compilation of the isolation results:

Diseases and Hosts	Nursery Localities
Damping-off:	
Norway spruce (Picea excelsa Link)	Washington Crossing, N. J.
Scotch pine (Pinus sylvestris L.)	Washington Crossing and Newfoundland, N. J.
Red pine	Washington Crossing and Newfoundland, N. J.; Mont Alto and Clearfield, Pa.
Northern white pine	Washington Crossing and Newfoundland, N. J.
Japanese larch (Larix leptolepis Murr.)	Washington Crossing, N. J.
Root-rot of first-year plants:	
Japanese larch	Washington Crossing, N. J.
Northern white pine	Washington Crossing and Newfoundland, N. J.
Pitch pine (Pinus rigida Miller)	Greenbank and Newfoundland, N. J.
Red pine	Washington Crossing and Newfoundland, N. J.; Greenwood Furnace, Pa.
Scotch pine	Washington Crossing, N. J.
Hemlock	Washington Crossing, N. J.
Norway spruce	Washington Crossing, N. J.; Greenwood Furnace, Pa.
Stem infections on first-year plants:	
Scotch pine	College Park, Md.; Mont Alto, Pa.; Washington Crossing, N. J.
Collar-rot of first-year plants:	
Yellow poplar (Liriodendron tulipifera L.)	Washington Crossing, N. J.

(Division of Forest Pathology, Bureau of Plant Industry, in cooperation with Allegheny Forest Experiment Station and University of Pennsylvania, Philadelphia, Pennsylvania).

ADDITIONAL RECORDS OF VIOLET SCAB

Anna E. Jenkins

The available records of violet scab (Sphaceloma violae Jenkins) were given in 1935[1] as follows:

United States:

Alabama: Irvington; Florida: Gainesville, Sanford, and Tampa; Georgia: Athens, Thomasville, and southern Georgia, locality not stated; Maryland: Anne Arundel County, Chevy Chase, Sycamore Island; New Jersey: Merchantville; New York: Rhinebeck; Pennsylvania: Bustleton, near Philadelphia; South Carolina: Summerville; Virginia: East Falls Church and Norfolk.

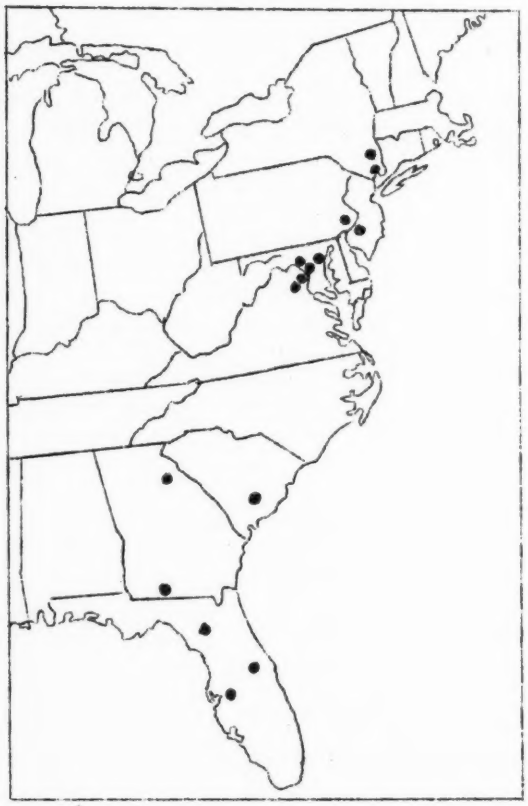

Figure 1. Distribution of violet scab in the United States as known up to 1937.

Dots represent counties from which the disease has been reported.

[1] Massey, L. M., and A. E. Jenkins. Violet scab caused by Sphaceloma. Cornell Univ. Agr. Exp. Sta. Memoir 176. 1935.

Australia:
New South Wales: Richmond.

Additional records of more or less severe attacks of the disease in the United States and in New South Wales, Australia, have been obtained since the article cited above was prepared, and the disease has also been discovered in the Union of South Africa. These additional records are cited below:

United States:

*[2]/District of Columbia, Rock Creek Park, on wild violet (Viola affinis x papilionacea), Oct. 12, 1935, J. A. Stevenson; Sept. 26, 1936, J. A. Stevenson and A. E. Jenkins; Oct. 24, 1937, A. E. Jenkins.

In this locality this species of violet grows luxuriantly and during the past three years has been abundantly affected by scab. Bird's foot violet (V. pedata) growing on a nearby hillside was free from infection as observed by the writer in early summer, 1934, when plants from this locality were transplanted to a greenhouse and infection readily obtained by artificial inoculation[3]/.

*Maryland, Chevy Chase, on cultivated violet, Aug. 8, 1937, R. J. Haskell. Infection severe, several hundred small lesions on a single leaf.

*New York, Rhinebeck, on cultivated violet, of general occurrence in this violet-growing section, where the disease was first noticed in 1929[3]/; Westchester County on cultivated violet, autumn, 1936. Records transmitted by L. M. Massey.

New Jersey, in field, on cultivated violet, 1933; Barrington, Jan. 15, 1935, very severe under greenhouse forcing conditions, also reported in summer of 1935. These records are from reports to the Plant Disease Survey by R. P. White. The previous record of violet scab from Merchantville was on cultivated pansy.

Pennsylvania, Philadelphia and vicinity, on cultivated violet, 1934, 1935, 1936, 1937, as reported to the Plant Disease Survey by R. S. Kirby.

---

[2]/An asterisk at the beginning of a paragraph indicates that the record is based on specimens now deposited in the Mycological Collections of the Bureau of Plant Industry.

[3]/Loc. cit. See footnote 1.

*Virginia, East Falls Church, on cultivated violet, L. H. Weld, Sept., 1936; vicinity of Colonial Village, on wild violet (Viola sp.), May 16, 1937, A. E. Jenkins.

New South Wales:
*Epping, 15 miles north of Sydney, and Bilpin, 60 miles north of Sydney, on cultivated violet; and Tuggerah Lakes on coast about 60 miles north of Sydney, on native wild species (Viola hederacea), April, 1936, T. H. Harrison. Specimens were contributed by Harrison[4/].

Union of South Africa:
*Graytown, Natal, on cultivated violet, Mar. 26, 1936, E. M. Doidge. Specimens and a culture were contributed by Doidge[4/].

In the United States the range of the disease by States and counties is shown on the accompanying map (Fig. 1, page 86).

(Division of Mycology and Disease Survey).

REPORTS ON TOBACCO DISEASES IN GEORGIA

DOWNY MILDEW (PERONOSPORA TABACINA): Because of intermittent warm and continuous clear weather throughout February downy mildew has not yet reached epidemic proportions in Georgia. These weather conditions were favorable for rapid development of tobacco seedlings in early beds located in moist places. Consequently seedlings reached transplanting size in some beds of the earliest sections the last week in February. A few fields of tobacco were set before the first of March. With continued clear weather during March, the mildew is not expected to be nearly so severe as it was in 1937. (J. G. Gaines, Mar. 4. Division of Tobacco and Plant Nutrition).

Because of the warm weather during the past few weeks, tobacco plants are very much advanced in growth, so much so in fact, that in a few of the southernmost counties, some tobacco has already been set. Downy mildew infection is now very general in the unsprayed beds of the southern area. In some cases, small infections have been reported in sprayed beds. (S. B. Fenne, Extension Plant Pathologist, March 9).

4/ These specimens were cited by Jenkins, A. E., and A. A. Bitancourt in Doenças das plantas causadas por Elsinoe e Sphaceloma. Rodriguésia 2 (num. esp.): 305-313. 1936 (1937).

CHLORINE INJURY IN TOBACCO PLANT BEDS: A tobacco plant bed reported to be severely affected with a disease other than downy mildew was examined in Cook County. The plants stopped growing, the leaves became thick and curled up at the edges, later turning yellow. Many of these plants died. In one bed over 50 percent of the plants were so affected. The plants had not been sprayed, nor had they been top-dressed with soda.

Mr. J. M. Carr, of the Coastal Plain Experiment Station, stated that he has frequently observed similar conditions in plant beds and also in the field where a fertilizer too high in chlorine, such as is found in kainit and muriate of potash, has been used. This condition is especially aggravated by dry sandy soil. The only remedy is to use a fertilizer with its potash derived from other than chlorine sources. To control this injury in the plant bed it might help to water the bed heavily, thereby leaching out the chlorine and aiding the plants to recover. (S. B. Fenne, Feb. 25).

DEVELOPMENT OF THE APPLE SCAB FUNGUS IN NEW HAMPSHIRE IN 1938

Stuart Dunn

Leaves from the Station orchard at Durham were examined for scab on March 11. They showed numerous perithecia, but most of them were quite small, poorly developed, with undifferentiated cells inside. This coincides with observations for most previous years.

Some figures on the date of initial spore shooting, determined by placing greased slides on dead leaves out in the orchard here, in connection with the duration of snow cover may be of interest.

Time of initial spore shooting in relation to duration of snow cover

Season	Total duration of snow cover in days	Date of initial spore shooting
1931-32	48	April 30
1932-33	52	May 10
1933-34	107	May 5
1934-35	69	May 8
1935-36	65	May 4
1936-37	20	May 6
Mean	60	May 5

From this it will be seen that the duration of snow cover varied considerably from year to year, but the dates of spore shooting

varied but slightly and there is no influence of duration of snow cover on this function.

(New Hampshire Agricultural Experiment Station)

ADDITIONAL REPORTS ON THE DEVELOPMENT OF THE APPLE SCAB FUNGUS THIS YEAR

PENNSYLVANIA: On February 24 Dr. R. S. Kirby and I collected apple leaves at Cashtown, Adams County, and found that a few of the scab spores were colored. We frequently find a few colored spores the last of February. (George L. Zundel, March 6. Pennsylvania State College).

INDIANA: Examination of apple leaves collected in central and southern Indiana on March 1, 1938, showed that the ascospores of Venturia inaequalis were mature. In many of the perithecia, between 50 and 75 percent of the asci contained brown spores. Ascospores were discharged from 6 of the 8 leaves which were placed for 10 hours in a moist chamber. These leaves had overwintered at Bedford. The ascospores have matured approximately 3 weeks earlier than in 1937 and very likely a considerable number of the ascospores will be discharged while the apple buds are dormant. (R. C. Baines, March 5. Purdue University Agricultural Experiment Station).

ILLINOIS: An unusually large number of perithecia contain mature ascospores at Urbana at this time (February 24). No examination was made previous to this date, but, judging from present conditions, brown ascospores could have been found a week or more ago. Some perithecia show 20 to 40 percent of asci with brown ascospores. Other leaves show no mature ascospores, but the asci well developed with the spores outlined. Perithecia are relatively abundant and easily located on the leaves owing to their advanced condition as compared to previous years.

The probable explanation of the early development of scab perithecia is to be found in the unusual weather of February. It was characterized by unusual and rapid fluctuations of temperature with several days with temperatures above 60°F. These alternated with short periods of temperatures below freezing. (H. W. Anderson, University of Illinois)

ARKANSAS: See page 94.

BRIEF NOTES ON PLANT DISEASES

BOTRYTIS STEM ROT ON TOMATOES IN VIRGINIA: Stem rot caused by Botrytis sp. has been very severe on greenhouse tomatoes at Hampton Institute since the autumn of 1937. (Thomas W. Turner, March 8. Hampton Institute).

SCLEROTINIA STEM ROT OF CRIMSON CLOVER IN VIRGINIA: Specimens and reports of damage from stem rot (Sclerotinia trifoliorum) have been received from Norfolk, Princess Anne, and Accomac Counties during the past month. The field in Princess Anne County was about one acre in size and the disease had destroyed about 25 percent of the stand. (Harold T. Cook, March 8. Virginia Truck Experiment Station).

WEATHER SUMMARY

FEBRUARY WEATHER: (From U. S. Dept. Agr. Weather Bureau Weekly Weather and Crop Bulletin, No. 9, Series 1938, for the week ending March 1, 1938).

Figure 1 shows that the month of February, 1938, was abnormally warm over much the greater portion of the country. In fact, it was warmer than normal everywhere, except very locally in the Northeast, the extreme Northwest, and the extreme West. From the Great Plains eastward and over much of the Rocky Mountain area the temperatures averaged rather generally from 3° to as much as 10° above normal.

Figure 2 shows that precipitation for the month was heavy over most of a wide belt extending from Texas and New Mexico northeastward over the Lake region, and also in nearly all of the Pacific area. The relatively heaviest falls occurred in California and the lower Great Plains where the month had from 200 to 400 percent or more, of normal rainfall. On the other hand, in the south Atlantic area, it was one of the driest Februaries of record, while precipitation was scanty along the Mexican border and over considerable northwestern sections.

THE WINTER OF 1937-38: (From Weekly Weather and Crop Bulletin, No. 10, Series 1938, for the week ending March 8, 1938).

In contrast to the winter of 1936-37, which was extremely cold over the western half of the country and abnormally warm in Eastern States, the winter of 1937-38, as a whole, was outstanding for uniformly mild weather throughout practically the entire country. Only one first-order Weather Bureau Station, Canton, New York, shows

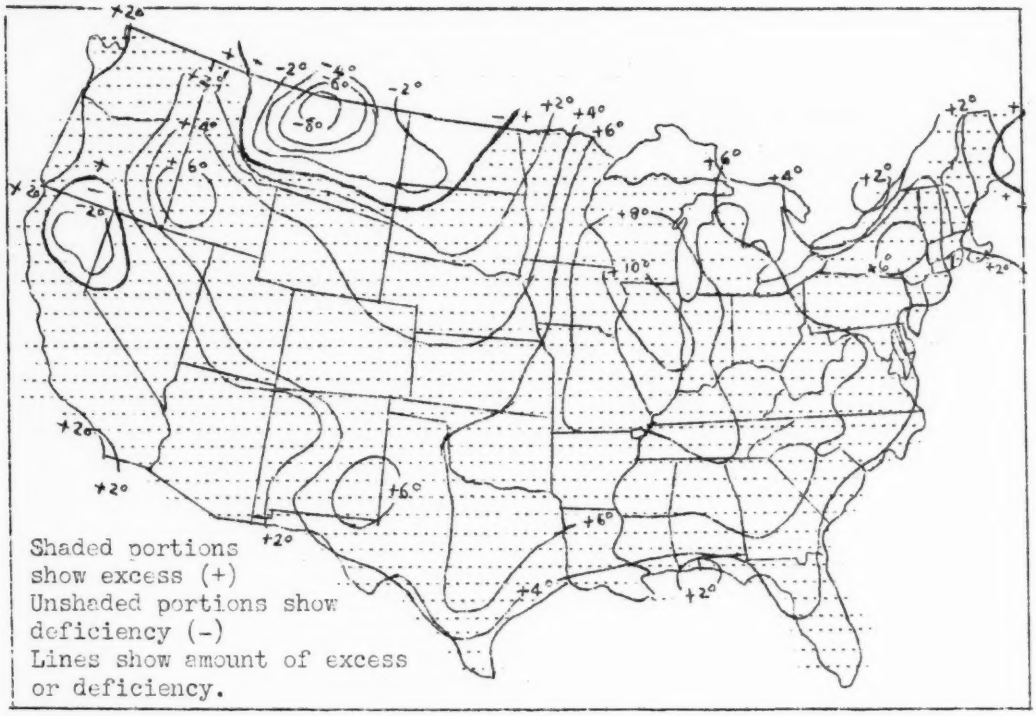

Fig. 1. Departure of mean temperature from the normal for February 1938.

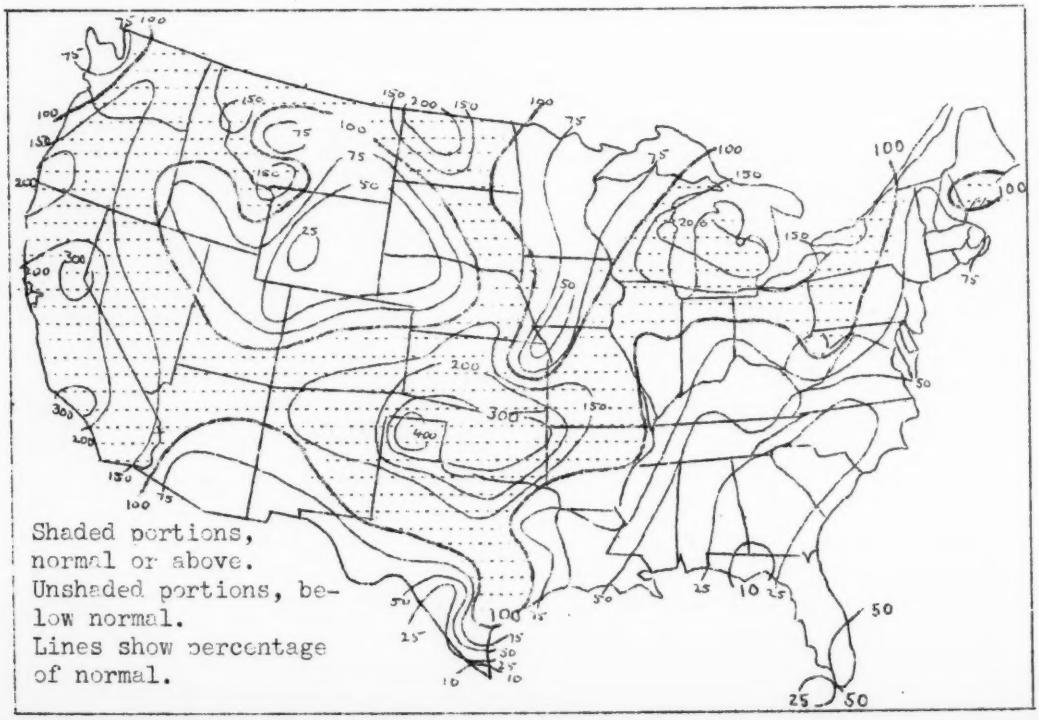

Fig. 2. Percentage of normal precipitation for Febrary 1938.

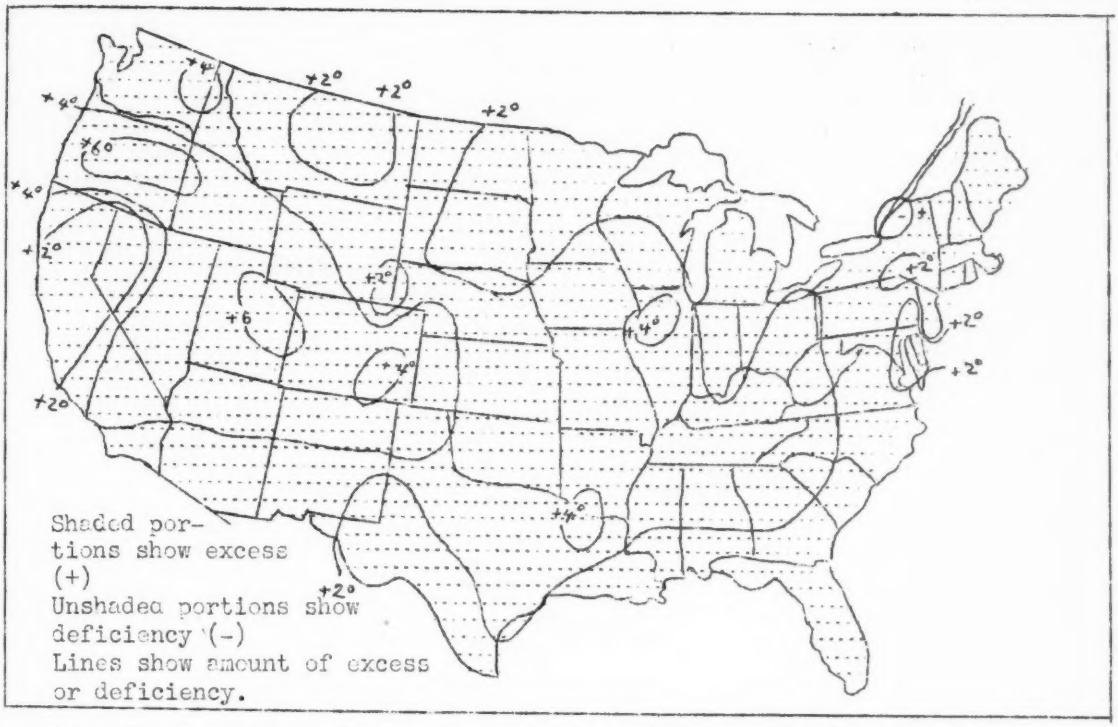

Fig. 3. Departure of mean temperature from the normal for the winter (December-February), 1937-38.

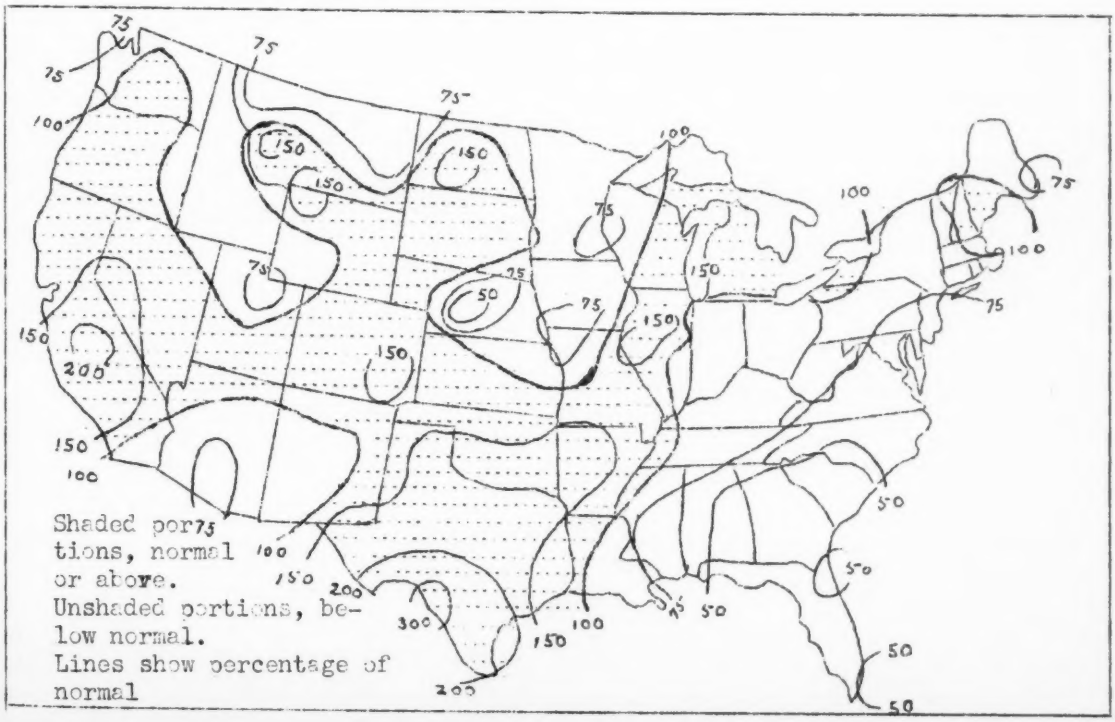

Fig. 4. Percentage of normal precipitation for the winter (December-February), 1937-38.

an average winter temperature below normal, and that only 2° below. All other stations, without exception, show substantially normal temperatures to decidedly above normal. The relatively warmest area, with the normal as a base, extended from the central and lower Mississippi River westward to the Plateau region of the West. In some localities of this area the winter averaged from 6° to 7° warmer than normal.

Precipitation for the winter was unevenly distributed. It was above normal in most areas west of the Mississippi River and below normal rather generally to the eastward. This distribution was largely opposite to that of last winter. Many southeastern sections had less than half the normal, but a large southern area between the Mississippi River and Rocky Mountains had from 1-1/2 to 3 times the normal amount. Nearly the entire Pacific coast had much more than normal rainfall, but most western mountain sections had less than normal snowfall. Because of the prevailing mild temperatures, the precipitation was more than usually in the form of rain.

NOTES ON THE DEVELOPMENT OF THE PERFECT STAGES OF VENTURIA INAEQUALIS AND SCLEROTINIA FRUCTICOLA IN NORTHWEST ARKANSAS IN 1938

John C. Dunegan

Overwintered apple leaves were collected on March 8, 1938 from three different orchards in northwest Arkansas. Mature perithecia of Venturia inaequalis showing fully formed and colored ascospores were found in all three collections. In addition many perithecia had spore formation completed in a few asci and in various stages of development in the balance of the asci.

On the other hand, several hundred overwintered peach brown-rot mummies were examined at the University of Arkansas farm and in a commercial orchard March 8-9 and no signs of apothecial development were observed.

In 1937 immature apothecia of Sclerotinia fructicola were found in peach mummies at the University farm on February 20 and fully expanded apothecia were collected on March 23, 1937. Mature perithecia of Venturia inaequalis were not found in 1937 in northwest Arkansas until the middle of April, so that development of both fungi in 1938 is just the reverse of their behavior in 1937.

(Cooperative work between the Division of Fruit and Vegetable Crops and Diseases, Bureau of Plant Industry, and the Arkansas Agricultural Experiment Station).